

WE CLAIM:

1. A method for reducing interference from initializing network devices in a data-over-cable system having a plurality of upstream channels, the method comprising:
 - aligning a plurality of maintenance intervals, wherein each maintenance interval of the plurality of maintenance intervals is associated with a corresponding upstream channel of the plurality of upstream channels; and
 - instructing the initializing network devices to range during the corresponding maintenance intervals of the plurality of maintenance intervals.
2. A computer readable medium, having stored therein instructions for causing a central processing unit to execute the method of Claim 1.
3. The method of Claim 1 wherein the aligning step comprises the steps of:
 - determining a measure of common maintenance start time for the plurality of maintenance intervals;
 - deciding whether the measure of common maintenance start time falls within a plurality of usage intervals, wherein each usage interval of the plurality of usage intervals is associated with an upstream channel of the plurality of upstream channels; and
 - when the measure of common maintenance start time falls within the plurality of usage intervals, scheduling the plurality of maintenance intervals to start at the measure of common maintenance start time.

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4. The method of Claim 3 wherein the determining step comprises the steps of:
receiving a measure of present time, T_P ;
calculating the measure of common maintenance start time equal to expression $T_P + T_B - T_P \bmod(T_B)$, wherein T_B is a measure of a base insertion time for the plurality of maintenance intervals in the data-over-cable system.

5 5. The method of Claim 3 wherein the deciding step comprises the steps of:
receiving a measure of usage interval start time, T_S , for each usage interval of the plurality of usage intervals; and

deciding whether the measure of common maintenance start time, T_M , satisfies
expression $T_S \leq T_M < T_S + L$, for each usage interval of the plurality of usage intervals, wherein
L is a measure of usage interval length for the usage interval.

6. The method of Claim 3 wherein the scheduling step comprises the steps of:
constructing a plurality of information elements, wherein each information element of
plurality of information elements corresponds to a maintenance interval of the plurality of
maintenance intervals; and

5 incorporating each information element of the plurality of information elements into an
Upstream Bandwidth Allocation Map message, wherein the Upstream Bandwidth Allocation
Map message corresponds to a usage interval of the plurality of usage intervals, and wherein the
information element contains an offset corresponding to the measure of common maintenance
start time.

7. The method of Claim 3 wherein the plurality of maintenance intervals is a plurality of Initial Maintenance intervals.

8. The method of Claim 3 further comprising the step of:
scheduling upstream transmissions within each usage interval of the plurality of intervals before the measure of common maintenance start time.

9. The method of Claim 3 further comprising the step of:
scheduling upstream transmissions within each usage interval of the plurality of intervals after the measure of common maintenance start time.

10. The method of Claim 1 wherein the aligning step comprises the steps of:
determining a measure of common maintenance start time for the plurality of maintenance intervals;

identifying a longest maintenance interval from the plurality of maintenance intervals;

5 calculating a number of maintenance intervals, N, that can occur during the longest maintenance interval for each upstream channel of the plurality of upstream channels;

deciding whether the measure of common maintenance start time falls within a plurality of usage intervals, wherein each usage interval of the plurality of usage intervals is associated with an upstream channel of the plurality of upstream channels; and

10 when the measure of common maintenance start time falls within the plurality of usage intervals, for each upstream channel of the plurality of upstream channels, scheduling N maintenance intervals to start at the measure of common maintenance start time.

11. The method of Claim 10 wherein the determining step comprises the steps of:
receiving a measure of present time, T_P ;
calculating the measure of common maintenance start time equal to expression $T_P + T_B -$
 $T_P \bmod(T_B)$, wherein T_B is a measure of a base insertion time for the plurality of maintenance
5 intervals in the data-over-cable system.

12. The method of Claim 10 wherein the deciding step comprises the steps of:
receiving a measure of usage interval start time, T_S , for each usage interval of the
plurality of usage intervals; and
deciding whether the measure of common maintenance start time, T_M , satisfies
5 expression $T_S \leq T_M < T_S + L$, for each usage interval of the plurality of usage intervals, wherein
 L is a measure of usage interval length for the usage interval.

13. The method of Claim 10 wherein the scheduling step comprises the steps of:
constructing a plurality of information elements, wherein each information element of
plurality of information elements corresponds to a maintenance interval of the plurality of
maintenance intervals; and
incorporating each information element of the plurality of information elements into an
Upstream Bandwidth Allocation Map message, wherein the Upstream Bandwidth Allocation
Map message corresponds to a usage interval of the plurality of usage intervals, and wherein the
information element contains an offset corresponding to the measure of common maintenance
start time.

14. The method of Claim 10 wherein the plurality of maintenance intervals is a plurality of Initial Maintenance intervals.

15. The method of Claim 10 further comprising the step of:
scheduling upstream transmissions within each usage interval of the plurality of intervals before the measure of common maintenance start time.

16. The method of Claim 10 further comprising the step of:
scheduling upstream transmissions within each usage interval of the plurality of intervals after the measure of common maintenance start time.

17. An apparatus for reducing interference from initializing network devices in a data-over-cable network having a plurality of upstream channels, the apparatus comprising:

a processing system;

a memory system;

5 a program stored in the memory system and executable by the processing system, the program comprising a set of instructions for reducing interference from the initializing network devices according to the following steps:

10 aligning a plurality of maintenance intervals, wherein each maintenance interval of the plurality of maintenance intervals is associated with a corresponding upstream channel of the plurality of upstream channels; and

instructing the initializing network devices to range during the corresponding maintenance interval of the plurality of maintenance intervals.

18. A method for reducing interference from initializing network devices in a data-over-cable system having a plurality of upstream channels, the method comprising:

receiving a measure of present time, T_P ;

calculating a measure of common maintenance start time, T_M , equal to expression $T_P + T_B$

5 - $T_P \bmod(T_B)$, wherein T_B is a measure of a base insertion time for a plurality of maintenance intervals in the data-over-cable system;

receiving a measure of usage interval start time, T_S , for each usage interval of a plurality of usage intervals;

deciding whether the measure of common maintenance start time, T_M , satisfies expression $T_S \leq T_M < T_S + L$, for each usage interval of the plurality of usage intervals, wherein 10 L is a measure of usage interval length for the usage interval;

when the measure of common maintenance start time, T_M , satisfies expression $T_S \leq T_M < T_S + L$, for each usage interval of the plurality of usage intervals, scheduling the plurality of maintenance intervals to start at the measure of common maintenance start time; and

15 instructing the initializing network devices to range during the plurality of maintenance intervals.

19. A computer readable medium, having stored therein instructions for causing a central processing unit to execute the method of Claim 18.

20. A method for reducing interference from initializing network devices in a data-over-cable system having a plurality of upstream channels, the method comprising:

receiving a measure of present time, T_P ;

calculating a measure of common maintenance start time, T_M , equal to expression $T_P + T_B$

5 - $T_P \bmod(T_B)$, wherein T_B is a measure of a base insertion time for a plurality of maintenance intervals in the data-over-cable system;

identifying a longest maintenance interval from the plurality of maintenance intervals;

calculating a number of maintenance intervals, N , that can occur during the longest maintenance interval for each upstream channel of the plurality of upstream channels;

10 receiving a measure of usage interval start time, T_S , for each usage interval of a plurality of usage intervals;

deciding whether the measure of common maintenance start time, T_M , satisfies expression $T_S \leq T_M < T_S + L$, for each usage interval of the plurality of usage intervals, wherein L is a measure of usage interval length for the usage interval;

15 when the measure of common maintenance start time, T_M , satisfies expression $T_S \leq T_M < T_S + L$, for each usage interval of the plurality of usage intervals, scheduling N maintenance intervals to start at the measure of common maintenance start time; and

instructing the initializing network devices to range during the plurality of maintenance intervals.

21. A computer readable medium, having stored therein instructions for causing a central processing unit to execute the method of Claim 20.